Medication Reference Terminology (MED-RT™) Documentation

U.S. Department of Veterans Affairs, Veterans Health Administration

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Introduction

Medication Reference Terminology (MED-RT™) is the evolutionary successor to the Veterans Health Administration National Drug File – Reference Terminology (VHA NDF-RT™). Both are formal ontology representations of medication terminology, pharmacologic classifications, and asserted authoritative relationships between them. Refer to Appendix I for background information on NDF-RT™.

A reference terminology provides common semantics for diverse implementations and is defined by Mayo as "a terminology in which concepts have a formal, machine-usable definition supporting data aggregation and retrieval." As such, MED-RT™ has been enhanced to rely on relationships or mappings involving concepts in selected, official standardized terminologies, now referenced externally rather than incorporated piecemeal, as was done in NDF-RT™.

RxNorm, a formal standardized medication terminology published by the National Library of Medicine (NLM), replaces the VHA National Drug File (NDF) formulary in MED-RT™, as a richer source of currently prescribable medications, active ingredients, and their inter-relationships. RxNorm provides normalized names for medications, as well as interoperability with VHA NDF and many of the commercial drug vocabularies commonly used in pharmacy management systems. Other standardized terminologies referenced in MED-RT™ include the Medical Subject Headings (MeSH) from NLM, using its concept hierarchies for chemical structure and therapeutics indexing; and the Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT) from SNOMED International, facilitating FDA established pharmacologic class mapping into its product and substance hierarchies.

MED-RT™ preserves and continues to publish most of NDF-RT's asserted pharmacologic classification relationships. It also maintains and publishes the mechanisms of action (MoA) and physiologic effects (PE) hierarchy concepts designated as National Committee on Vital and Health Statistics (NCVHS) standards to describe medication pharmacologic classification, specified as components of the Federal Medication Terminologies (FMT) initiative.

The Structured Product Labeling (SPL) initiative by the Food and Drug Administration (FDA) relies on concepts from MED-RT™ MoA, PE, and other classifications to index active moieties in FDA established pharmacologic classes (EPC) within the SPL. A team of FMT Subject Matter Experts (FMT SME) reviews agency requests and recommends specific MED-RT™ enhancements and indexing, which FDA takes into consideration when releasing its FDA SPL pharmacologic classification indexing.

MED-RT™ publishes all its asserted relationships identified by their authoritative source(s). Conflicting assertions from different authorities regarding pharmacologic classification, indexing, or mapping can coexist, labeled clearly in the database to facilitate subset extraction. MED-RT™ currently disseminates new MED-RT™-owned or legacy NDF-RT™ relationships, FMT SME recommendations, and official FDA SPL

pharmacologic classifications, labeled as MEDRT, FMTSME, and FDASPL authorities, respectively.

MED-RT™ Content Model

Overview

MED-RT™ is a concept-oriented *terminology*, a collection of *concepts* each of which represents a single meaning. Every concept has one fully-specified and/or preferred name, and an arbitrary number of synonymous names. Concepts in external terminologies referenced in MED-RT™ have a native unique identifier, considered here as their "Code in Source". Additionally, MED-RT™ assigns an alphanumeric unique identifier (NUI) to every concept it owns, published to label and track that meaning across releases.

Participating terminologies each exist in a separate namespace. Within a single namespace, concepts have a unique fully-specified or preferred name and "Code in Source" identifier. Within MED-RT™, individual concepts are designated and referenced by their unique namespace name, concept name, concept code/identifier triple. In addition to several external terminology namespaces, MED-RT™ has its own "MED-RT" namespace for all concepts it owns and all relationships it asserts between concepts in any namespaces.

MED-RT™ owns and maintains subsets of pharmacologic classification concepts organized into distinct *taxonomies,* that is, hierarchies of concepts based on generalization. The meaning of each concept within a taxonomy is both more general than the meanings of its descendants (if any) and more specific than the meanings of its ancestors (if any).

MED-RT™ consists primarily of named relationships between concept pairs, each asserted by an explicit authoritative source. Either concept in the relationship may be a native MED-RT™ pharmacologic class or some concept in an external terminology (e.g., RxNorm, MeSH, SNOMED CT). Relationships asserted by one explicit authority may coexist with conflicting assertions from different authorities.

Therefore, as a reference terminology and ontology, MED-RT™ provides a formal content model that describes medication active ingredients, both computationally and to humans, by naming or identifying relevant concepts and describing them via named relations to other concepts, either within MED-RT™ or in external terminologies. By content model, we mean the concept types or hierarchies, hierarchical and associational relationships, and conceptual properties in an ontology. Assuming a basic knowledge of content modeling and representational elements, the next sections describe in more detail the specific content model of MED-RT™.

In MED-RT™, generic ingredients (RxNorm concepts) are described in terms of their "established pharmacologic classifications" (FDA SPL EPC concepts), chemical

structures (MeSH concepts), mechanisms of action (MED-RT concepts), physiologic effects (MED-RT concepts), and therapeutics, e.g., may treat or may prevent, (MeSH concepts). Furthermore, EPCs (MED-RT concepts) are mapped into external product and substance classification hierarchies (SNOMED CT concepts). Many of the descriptive concepts can themselves be explained via their position in hierarchical classifications or taxonomies of related concepts.

A simplified diagram of the MED-RT™ content model is shown in Figure 1. This ontology representation of knowledge is formally-computable, facilitates classification inferences, closely resembles natural scientific descriptions, and is quite easy for people to read and understand.

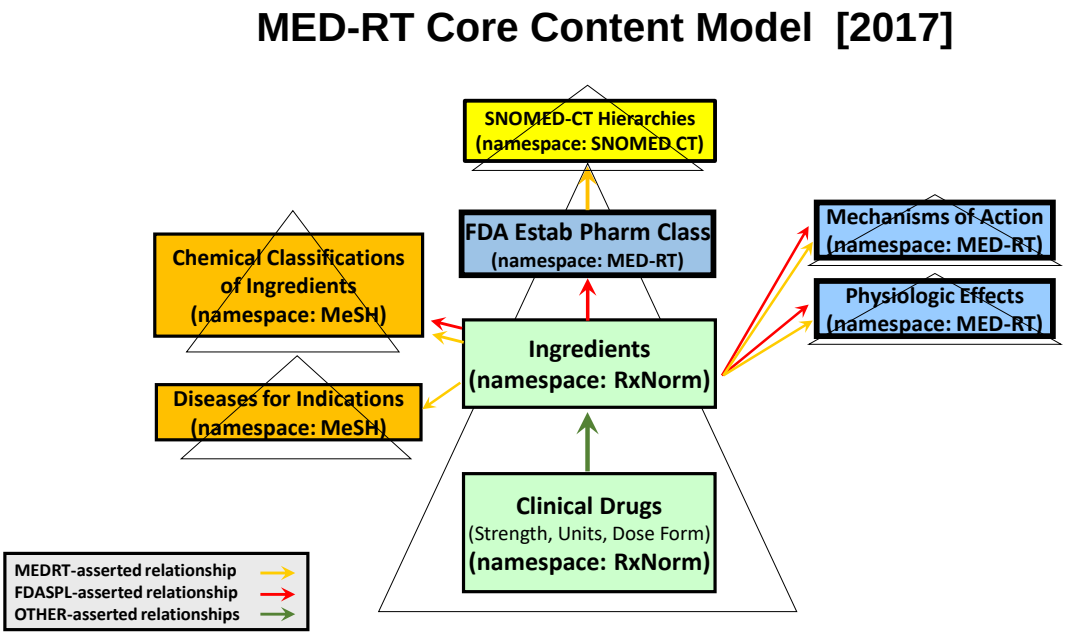

Figure 1: Content Model for MED-RT™

Triangles denote hierarchies of related concepts, categorized in the rectangles within the triangles. Concepts exist either in the local (MED-RT) namespace or in designated external namespaces (RxNorm, etc.), Taxonomic or hierarchical relationships (upward-pointing green/red arrows) group medication concepts into poly-hierarchies, classified by the FDA EPC of their active ingredient(s) and its mappings into SNOMED CT hierarchies. Various named associational relationships (sideways-pointing amber/red arrows) define the central ingredient concepts (green) from which they originate in terms of the reference concepts pointed to. MED-RT (or legacy NDF-RT)-asserted relationships are denoted by amber arrows, FDASPL-asserted relationships by red arrows.

MED-RT™ **core content** consists of all concepts in the MED-RT namespace (bold blue boxes) plus all MEDRT- or FDASPL-asserted relationships (amber/red arrows). Releases contain only the core content.

Terminology Namespaces

Terminologies participating in MED-RT™ each exist in a separate namespace. Within each namespace, concepts have a unique fully-specified or preferred name and a native "Code in Source" identifier. The unique triple of namespace name, concept name, concept code/identifier precisely identifies any concept in any terminology. Terminologies with their abbreviated namespace names for MED-RT™ are as follows:

- **Medication Reference Terminology [MED-RT]** – the local terminology containing native pharmacologic classification concepts (e.g., MoA, PE, EPC) and all relationships asserted between concepts in any namespaces. The code in source for MED-RT™ namespace concepts is the NUI.

- **RxNorm [RxNorm]** – an external medication terminology, published by the National Library of Medicine (NLM), containing normalized names for currently prescribable medications, active ingredients, and various relationships. The code in source for RxNorm namespace concepts is the RxCUI.

- **Medical Subject Headings [MeSH]** – an external biomedical terminology, published by the National Library of Medicine (NLM) as a thesaurus to index the biomedical literature. MeSH is used here to provide both chemical structure classification hierarchies for active ingredients, and as a source of disease or finding concepts to express therapeutic indications and contraindications. The code in source for MeSH namespace concepts is the MeSH CUI (aka M#).

- **Systematized Nomenclature of Medicine Clinical Terms [SNOMED CT]** – an external biomedical and clinical terminology, published by SNOMED International as a formal nomenclature for medicine. SNOMED CT is used here to provide product and substance classification hierarchies for FDA SPL EPC concepts. The code in source for SNOMED CT namespace concepts is the SNOMED concept identifier.

More information about participating terminologies, including complete name and version, may be found in special namespace metadata in the release file and the release notes for MED-RT™.

Concept Types

MED-RT™-owned concepts reside in the **MED-RT** namespace and are grouped into a small number of native hierarchies. Concept names are tagged with their typed-suffix "[TAG]" shown, and currently include:

- **Mechanisms of Action [MoA]** – molecular, subcellular, or cellular effects of drug generic ingredients, organized into a chemical function classification hierarchy, beneath the "Cellular or Molecular Interactions [MoA]" concept.

- **Physiologic Effects [PE]** – tissue, organ, or organ system effects of drug generic ingredients, organized into an organ system classification hierarchy, beneath the "Physiological Effects [PE]" concept.
- **FDA Established Pharmacologic Classes [EPC]** – "clinically-meaningful, scientifically-valid pharmacologic classifications" maintained here on behalf of FDA for their Structured Product Labels, aggregated together and also mapped to SNOMED CT product and substance hierarchy concepts.
- **Pharmacokinetics [PK]** – collections of concepts describing the absorption, distribution, and elimination of active ingredients, beneath the "Clinical Kinetics [PK]" concept.
- **Therapeutic Categories [TC]** – a small, experimental collection of general therapeutic intents of drug generic ingredients, organized into an organ system-oriented classification hierarchy, beneath the "Therapeutic Categories [TC]" concept. These concepts are experimental, and are used exclusively to model FDA established pharmacologic class concepts with diverse, poorly defined, or undefined mechanisms of action and/or physiologic effects.
- **Terminology Extensions for Classification [EXT]** – a local MED-RT extension primarily with chemical classification concepts requested by FDA SPL for eventual addition to NLM MeSH, beneath the "Terminology Extensions for Classification [EXT]" concept, mapped to MeSH hierarchy concepts if possible.

Generic ingredients are also grouped into 26 alphabetical bins for easier navigation into RxNorm.

As of this writing, the conceptual coverage of MED-RT™ is derived through periodic algorithmic "refresh" of external terminologies, as well as FDA SPL-driven enhancements by subject matter experts. The latter is described in more detail later (Periodic Maintenance).

Relationships

Relationships help to describe concepts according to named, directed relations to other concepts. MED-RT™ relationships may be hierarchical/taxonomic (e.g., Parent Of, Child Of) or associational (e.g., has_MoA). Association names are often prefixed with "*has_*" and contain the name or acronym of the target concept type, although exceptions are made for several different associations that refer to the same types. Inverse association names are often suffixed with "*_of*" instead (e.g., MoA_of). Both the origin and target concepts in every MED-RT™ relationship are identified precisely by their unique triple of namespace name, concept name, and code-in-source.

Valid MED-RT™ named relationships are listed next. Most association relationships will originate from RxNorm concepts or EPC concepts. Hierarchical relationships are only asserted for the MED-RT™ concept types listed above. The usual target concept terminology, or CTY (if a MED-RT™ concept), is indented beneath the relationship.

- **Parent Of** – hierarchical or taxonomic parent of concept
  - Inverse: **Child Of**
  - **CTY** target: same as concept of origin (e.g., MoA, PE, EPC, PK, TC, EXT)
- **has_SNOMED_parent** – mapped hierarchical or taxonomic parent of concept in SNOMED CT
  - Inverse: **SNOMED_parent_of**
  - Target: SNOMED CT
- **has_SNOMED_child** – mapped hierarchical or taxonomic child of concept in SNOMED CT
  - Inverse: **SNOMED_child_of**
  - Target: SNOMED CT
- **has_SNOMED_synonym** – mapped equivalent concept in SNOMED CT
  - Inverse: **SNOMED_synonym_of**
  - Target: SNOMED CT
- **has_Chemical_Structure** – chemical structural class mapping of an ingredient
  - Inverse: **Chemical_Structure_of**
  - Target: MeSH
- **has_Ingredient** – chemical structure mapping of an ingredient
  - Inverse: **Ingredient_of**
  - Target: MeSH
- **has_MoA** – molecular, subcellular, or cellular level functional activity of an ingredient
  - Inverse: **MoA_of**
  - **CTY** target: MoA
- **has_PE** – tissue, organ, or organ system level functional activity of an ingredient
  - Inverse: **PE_of**
  - **CTY** target: PE
- **has_TC** – therapeutic intent categorization of an ingredient
  - Inverse: **TC_of**
  - **CTY** target: TC
- **CI_ChemClass** – contraindicated chemical structural class of a co-administered ingredient
  - Inverse: **[Inv] CI_ChemClass**
  - Target: MeSH
- **CI_MoA** – contraindicated mechanism of action of a co-administered ingredient
  - Inverse: **[Inv] CI_MoA**
  - **CTY** target: MoA
- **CI_PE** – contraindicated physiological effect of a co-administered ingredient
  - Inverse: **[Inv] CI_PE**
  - **CTY** target: PE
- **CI_with** – therapeutic or co-morbid contraindication of an ingredient
  - Inverse: **[Inv] CI_with**
  - Target: MeSH
- **may_treat** – therapeutic use or indication of an ingredient

        - Inverse: **may_be_treated_by**
        - Target: MeSH
    - **may_prevent** – preventative use or indication of an ingredient
        - Inverse: **may_be_prevented_by**
        - Target: MeSH
    - **may_diagnose** – diagnostic use or indication of an ingredient
        - Inverse: **diagnosed_with**
        - Target: MeSH
    - **induces** – therapeutic effect or state caused by an ingredient
        - Inverse: **induced_by**
        - Target: MeSH
    - **has_PK** – absorption, distribution, and elimination of an ingredient
        - Inverse: **PK_of**
        - **CTY** target: PK
    - **has_active_metabolites** – chemically-active metabolic product of an ingredient
        - Inverse: **active_metabolites_of**
        - Target: MeSH
    - **site_of_metabolism** – metabolic anatomic site of an ingredient
        - Inverse: **metabolism_at_site**
        - **CTY** target: PK
    - **effect_may_be_inhibited_by** – an ingredient interfering with therapeutic effect of an ingredient
        - Inverse: **may_inhibit_effect_of**
        - Target: MeSH

All MED-RT™ relationships have an **Authority** qualifier which contains the acronym of its asserting source authority. Conflicting relationships from different authorities can co-exist in the knowledge base. Valid relationship source authorities are listed next:

MEDRT - relationship asserted by legacy NDF-RT™ subject matter experts or by MED-RT™
FMTSME - relationship recommended by FMT subject matter experts for SPL
FDASPL - relationship assigned by FDA SPL to active ingredient moieties

Concept Properties or Attributes

Concept properties are informational attributes of concepts. A property value is a text string (e.g., name, UI, data flag) attached to a single concept.

All MED-RT™ concepts have the following properties contained in the MED-RT namespace:

- **Preferred Term** – *untagged* name of MED-RT namespace concepts
- **Synonym** – synonymous name(s) of MED-RT namespace concepts
- **NUI** – MED-RT™ unique identifier, a unique alphanumeric value (N#) assigned only to every concept owned by MED-RT

- **CTY** – concept type, a category or label assigned only to every concept owned by MED-RT. Valid CTY values include:
  - **EPC** – FDA SPL established pharmacologic class (MED-RT)
  - **MoA** – mechanism of action (MED-RT)
  - **PE** – physiologic effect (MED-RT)
  - **TC** – therapeutic category (MED-RT)
  - **PK** – pharmacokinetics (MED-RT)
  - **EXT** – local terminology extensions (MED-RT)
  - **HC** – local hierarchical concept to aggregate subconcepts, alphabetically or conceptually (MED-RT)

External namespace concepts referenced in MED-RT are identified precisely by their unique triple of namespace name, concept name, and native code-in-source.

The NDF VUID property, formerly in NDF-RT, is now available as one of many interoperable UI's in native RxNorm concepts. The UMLS_CUI property, a unique concept identifier from the NLM UMLS Metathesaurus, will be available in the future for MED-RT concepts within that terminology resource.

Any NUI property value previously assigned to a MeSH-derived [Chemical/Ingredient] or [Disease/Finding] concept in NDF-RT will be mapped, if possible, to the native MeSH CUI (aka M#) identifier within a supplemental NDF-RT NUI to MeSH CUI cross-walk file. Additionally, any NUI property value previously assigned to a VANDF Ingredient, Clinical Drug, Dose Form or VA Class concept in NDF-RT will be mapped to the native RxCUI identifier in a separate supplemental NDF-RT NUI to RxCUI cross-walk file. These supplemental files will be created when NDF-RT production ceases, to reflect content at the time of MED-RT™ initialization. The files may also be updated periodically. The files are described in more detail later (Publication).

Sample Concepts

Figures 2 and 3 below depict sample concepts as screenshots using the Apelon Open Source Distributed Terminology System (DTS) Editor tool.

Figure 2 illustrates *italicized* additional content asserted by various MED-RT authorities, referencing an ingredient concept in the RxNorm terminology namespace. Only relationships ("associations") are asserted. Note the conflicting associations, each with an explicit but different Authority. Non-italicized content is native to RxNorm, as curated by the NLM. Some proprietary data requires licensing.

Figure 2: RxNorm Ingredient Concept with MED-RT Asserted Content

Additional content asserted by MED-RT authorities is *italicized*. Concept has been truncated to fit page.

Figure 3 illustrates a native MED-RT namespace concept, an EPC with properties and relationships asserted by various MED-RT authorities. It is non-italicized because all information comes from the curators of the MED-RT namespace.

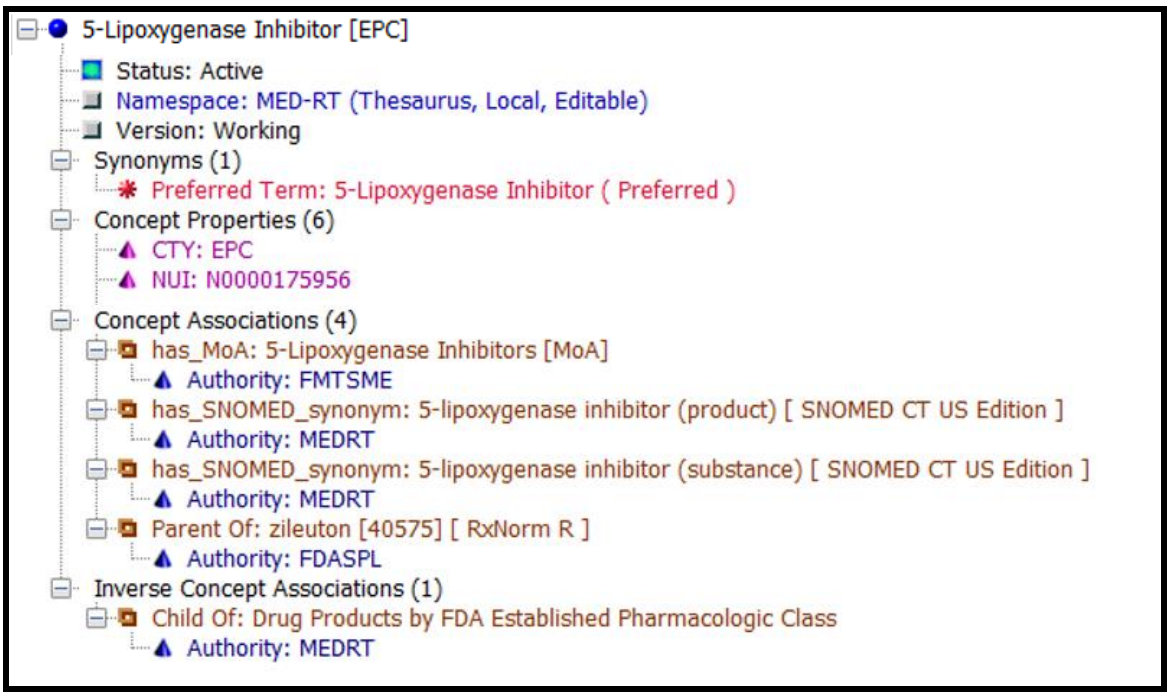

Figure 3: Native MED-RT Namespace Concept

An EPC concept with content asserted by various MED-RT authorities (not italicized).

MED-RT™ Maintenance and Publication

Periodic Maintenance

Automated Content Enhancements and Updates

MED-RT™ contains relationships to concepts in relevant external terminologies previously discussed. The Apelon Open Source Distributed Terminology System (DTS) software provides an automated maintenance environment for these terminology namespaces, keeping content up-to-date and synchronized among these resources in accordance with their release schedules. On a periodic basis, MED-RT™ is also synchronized with FDA SPL pharmacologic classifications for specified active moieties, via indexing files published by FDA.

Expert Content Modeling

In order to assure continual accuracy of content and to remain current with emerging drug knowledge, an Interagency Expert Panel (IEP) was convened in 2006 to review and vet recommended changes, then to NDF-RT™. Initially responsible for maintenance and revision of the MoA, PE, and Chemical/Ingredient hierarchies in response to pharmacologic class requests received from FDA, the IEP is the primary body overseeing all changes in this terminology resource. It also works in conjunction with a Federal Medication Terminologies Subject Matter Expert (FMT SME) team, which evaluates pharm class modeling, as well as external agency modeling requests that may be deemed necessary for clinical decision support. Based on input from these groups, content modelers make needed changes, now to MED-RT™. The IEP, comprised of members from various agency stakeholders with interest in drug terminologies, including VA, FDA, NLM, NCI, and CMS, meets monthly as needed to discuss content issues or evolutionary changes.

Publication

Release Process, Schedule, and Distribution Sites

MED-RT™ is published ten times per calendar year, with combined releases occurring for December/January and August/September, following a consistent process that is briefly summarized in this section.

Following review, comment, and approval of changes recommended by the FMT SMEs or the IEP for the current release, processing of the new release begins, incorporating the content refreshes mentioned above. MED-RT™ **core content** consists of all concepts in the MED-RT namespace, plus all MEDRT- or FDASPL-asserted relationships and properties. Releases contain only this core content. Final XML release files are produced via a programmatic production process. During this process, new MED-RT™ namespace concepts are assigned NUIs and CTYs, then release files (shown below in Table 1) are generated and packaged.

New versions are posted on a password-protected, contractor-hosted, download site each month. Notification of the new MED-RT™ version is also given to external (government) publication locations, which post the updated files as well. At this time, MED-RT™ release files are also available from the National Cancer Institute Enterprise Vocabulary Services (EVS) on the Federal Medication Terminologies webpage. MED-RT™ content is also integrated into the National Library of Medicine RxNorm Full Monthly Release, available on the RxNorm webpage, to UMLS licensees on the first Monday of the month.

Table 1: Monthly MED-RT™ Packaged Release Files

Filename	Contains
Core_MEDRT_YYYY.MM.DD_DTS.zip	• MED-RT in Apelon DTS default format • Concept name + NUI text file • Release notes • MED-RT documentation
Core_MEDRT_YYYY.MM.DD_XML.zip	• MED-RT in Custom XML format • Concept name + NUI text file • Release notes • MED-RT documentation
Core_MEDRT_YYYY.MM.DD_SPL.zip	• Text files listing concept names + NUIs for MoA, and PE hierarchies

Table 2: Accessory MED-RT™ Files

Filename	Contains
NDFRT-NUI_MeSH-CUI_crosswalk_file_ YYYY.MM.DD.txt	• Text file listing NUI, NDF-RT derived [Chemical/Ingredient] or [Disease/Finding] concept name, MeSH CUI, and MeSH concept name
NDFRT-NUI_RxNorm-RxCUI_crosswalk_file_ YYYY.MM.DD.txt	• Text file listing NUI, NDF-RT VANDF Ingredient name or Clinical Drug or Dose Form or VA Class, RxCUI, and RxNorm concept name
NDFRT-NUI_MeSH-CUI_DTS_crosswalk_file_ YYYY.MM.DD.txt	• Text file listing NUI, NDF-RT derived [Chemical/Ingredient] or [Disease/Finding] concept name, MeSH CUI, and MeSH concept name in DTS format
NDFRT-NUI_RxNorm-RxCUI_DTS_crosswalk_file_ YYYY.MM.DD.txt	• Text file listing NUI, NDF-RT VANDF Ingredient name or Clinical Drug or Dose Form or VA Class, RxCUI, and RxNorm concept name in DTS format

Resources and Assistance

If we can be of any assistance in the transition from NDF-RT to MED-RT, please contact us at MEDRT@jpsys.com.

Appendix I: NDF-RT™ Background

In 2003, the Department of Veterans Affairs Veterans Health Administration (VHA) began construction of an Enterprise Reference Terminology (ERT)[1]. ERT includes a federated set of vocabulary content; a hybrid commercial off-the-shelf (COTS) and custom-developed software and technology infrastructure; and supporting business processes and documentation. Since its inception, VHA ERT assembled one of the largest terminology repositories in the country.

Controlled medical terminology provides many benefits, and chief among them is support for the creation and use of comparable patient descriptions. Such data comparability can help:

- Reduce ambiguity while describing medical situations
- Improve human productivity
- Improve the performance of decision support applications
- Improve compliance with existing or emerging VHA and other federal mandates and standards
- Enable the exchange of healthcare information
    - between departments in the same VHA medical center or care facility
    - between VHA and extra-VHA facilities
    - between applications
- Manage and leverage information in electronic medical records
- Improve the display of patient information
- Make CPOE (Computer-based Provider Order Entry) more productive
- Enable decision support to reduce errors and improve quality
- Support evidence-based medicine

Use of controlled terminology in electronic medical records greatly enhances the ability of both healthcare professionals and computer applications to collect and leverage available healthcare data productively. The VHA ERT is designed to provide terminology and terminology services that support these objectives at national scale. In this context, the notion of a *reference* terminology is a resource focused on scalable, longitudinal terminology reuse by computers, applications, and their human users.

As part of the ERT, the VHA National Drug File – Reference Terminology (NDF-RT™)[1,2] is the reference terminology for medications, an enhancement of the VHA National Drug File (NDF) in a formal description logic ontological representation. Since its beginnings under the auspices of the Government Computer-Based Patient Record (GCPR) project in 2001, NDF-RT™ has evolved into a nationally important drug terminology resource.

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[1] Lincoln MJ, Brown SH, et al. U.S. Department of Veterans Affairs Enterprise Reference Terminology Strategic Overview. *Stud Health Technol Inform*. 2004;107(Pt 1):391-5.

[2] Brown SH, Elkin PL, et al. VA National Drug File Reference Terminology: A Cross-institutional Content Coverage Study. *Stud Health Technol Inform*. 2004;107(Pt 1):477-81.

Its unique description logic-based reference model, accessible intellectual property status, and championing by informatics experts both within and outside VHA have resulted in NDF-RT's adoption by a number of government and academic projects, including adoption of the mechanisms of action (MoA), physiologic effects (PE), and chemical ingredient by structure (CI) hierarchy subsets as a Consolidated Health Informatics (CHI) standard used to describe medication pharmacologic class. NDF-RT™ is part of the Federal Medication Terminologies (FMT) initiative and has been cited or studied within numerous academic and industry publications.

The NDF-RT™ Interagency Expert Panel (NDF-RT™ IEP), an on-going collaboration among the Department of Veterans Affairs (VA), Food and Drug Administration (FDA), National Library of Medicine (NLM), National Cancer Institute (NCI), Centers for Medicare and Medicaid Services (CMS), and other federal agencies, advises the VHA on maintenance and improvement of NDF-RT™ content, as needed, for use in the FDA's Structured Product Labeling (SPL) initiative and other FMT-related efforts.

The FDA SPL initiative aims to reduce the future costs of drug terminology maintenance and improve patient care and safety. Concepts from the NDF-RT™ MoA, PE, and CI hierarchies have been selected by FDA to index active moieties in FDA established pharmacologic classes [EPC] within the SPL. The NDF-RT™ IEP oversees maintenance and enhancement of these concept hierarchies as well as other content issues, leveraging the expertise of a VHA Subject Matter Expert (VHA SME) team that reviews agency requests and recommends specific NDF-RT™ changes.

Recently, to better support the meaningful use of interoperable electronic health records, NDF-RT™ has been enhanced to explicitly identify concepts and relationships in nationally-designated value sets, including their authoritative sources. Conflicting assertions from different authorities regarding pharmacologic classification or indexing will now be allowed to coexist, clearly labeled in the knowledge base to facilitate subset extraction.